

Scientific activity of Nasir al-Din al-Tusi in historical retrospect

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Abstract

At the beginning of the VII century in the political life of the Near and Middle East, fundamental changes have taken place. The Arabs in a short time conquered a colossal territory, which included the lands of Iran, North Africa, North-West India, the Asian provinces of Byzantium, most of the former Roman Empire. In the conquered cities of the caliphate, observatories were built; libraries were created at palaces, mosques, and madaris. At the end of VII century in Baghdad, the first scientific center, an academy, the House of Wisdom, was founded, in which scholars who spoke different languages were assembled. During this period, the Arabic language became not only the state language of the Near and Middle East, but also the language of science and culture. Here the translation and commentary activity were very developed, the main works of ancient thought, such as the writings of Aristotle, Ptolemy were published in the 9th century in the Arabic-speaking world. In the history of the world's philosophical science, it is known that the peak of Arabic-speaking Aristotelianism was the work of Ibn Rushd, who turned to the study and commenting of Aristotle at the insistence of Ibn Tufail and stimulated the emergence of the interest of Eastern philosophical thought towards Antiquity. For two centuries from 750 to 950 years, the works of ancient authors on philosophy, mathematics, medicine, alchemy, and astronomy were translated into Arabic, which indicates the high scientific potential of that time in the East. Here developed such scientific disciplines as physics, chemistry, mathematics, medicine, astronomy, geography, botany. At the same time, Ibn Rushd composed 38 commentaries on the works of Aristotle, the "Republic" of Plato, the treatise "On the Mind" of Alexander of Aphrodisias, which subsequently had an important influence on the work of Nasir al-Din al-Tusi. Thus, this period in the history of Eastern scientific thought is marked by high intellectual potential.

Keywords: Azerbaijan, Nasir al-Din Tusi, Ibn Rushd, East, philosophy

Introduction

The study of the history of scientific thought of this era and activity of scientists show that Azerbaijani science reached a significant flourishing during this period, marking the processes of the Eastern Renaissance. Significant development is observed in as-

tronomy, astrology, geography, mathematics, geology, engraving, music, etc. in the late 13th - early 14th century. In many cities of Azerbaijan, architects built rabats, madrasah,

mosque and other structures. Maragha¹ and Tabriz were the main centers of the literary and scientific life of Azerbaijan at that time. Scientists from different countries worked in the Maragheh Observatory, even from distant China.

During the rule of Ilkhanate dynasty, Hulagu Khan (1256-1265) and Abaqa Khan (1265-1282), an outstanding scholar and organizer of science in Azerbaijan, Muhammad ibn Muhammad ibn al-Hasan al-Tusi made a significant contribution to the development of almost all the well-known branches of sciences, which the center for many years became Azerbaijan. Mathematics, ethics, cosmology, mineralogy, trigonometry, geography, history, law, calendars, medicine, education, morality, logic, theology, poetics, calligraphy are not only a complete list of research fields, which are deservedly headed by Nasir al-Din al-Tusi².

He was handsome, magnificent, noble, generous and patient person, faithful in friendship, possessed many high virtues and rendered a great help in case of adversity³.

The universal nature of the knowledge of Nasir al-Din gives grounds to assert that in his youth he received a many-sided education, which brought him great popularity. He lived with the Assassins until 1256 for more than twenty years and it was during this period that he wrote his famous works "Sharhal", "Isharat", "Tahrir Majesti".

Founded by Nasir al-Din al-Tusi, "Dar-al-ilm ve hikma" and the observatory in Maragha were the first Academy of Sciences in the Middle Ages, not only in the countries of the East, but also in Europe.

It was founded in 1259 on a hill to the north of the city of Maragha. With the permission of the Mongolian Hulagu khan, the

Maragheh Observatory was built. According to the historian Rashid ad-din, the construction of the world's largest observatory at that time took almost 7 years.

The history of the construction of this observatory is interesting. It is curious that one of the researchers of this story was Karl Marx, who knew the culture of the East very well. He wrote: "At a time when Khoja Nasir wanted to build an astronomical observatory in the city of Maragha and announced the estimated costs, Hulagu asked: "Is the science of the stars so useful that it is worth spending a huge amount of money on the observatory? "In response, Nasir said:" Let me carry out such an experiment: Let's arrange for someone secretly to go up this mountain and cast down a large empty caldron, but no one knew about it." Therefore, they did. When the caldron came down from the mountain, it made a loud noise. Because of this, panic broke out among the troops of Hulagu-khan. Nasir and Hulagu watched all this, and they remained calm. Then Nasir turned to Hulagu with the following words: "We know the reason for this noise, but the troops do not know, that's why we are calm here, and they are worried" (that is, ignorance of the real cause of the noise caused inadequate reaction of the troops). Similarly, Nasir al-Din al-Tusi persuaded the ruler that for a correct life orientation, it is necessary to have not erroneous but genuine ideas about the causes of what is happening. Therefore, he believed, it is necessary, besides the immediate reasons, to be aware of the reasons, precedents in the general chain of cause-reason relations, which is possible only through the knowledge of the general laws prevailing in the universe, of which the Earth is a part. This experiment and Tusi's arguments persuaded Hulagu-khan to finance the construction of the observatory»⁴.

Less than a year, Nasir al-Din chose a place for the observatory. Nasir al-Din personally participated in drawing up the draft

¹ Maragha is the largest architectural and artistic center of medieval Azerbaijan.

² Бунятов З. М. Насир ад-дин Мухаммед ат-Туси и развитие науки в Азербайджане в XVIII веке // Известия Академии Наук Азербайджанской ССР Серия истории, философии и права. 1982. № 1.

³ Бунятов З.М., Насир ад-Дин ат-Туси: новые биографические данные. Известия Ака наук Азербайджанской ССР. Серия истории философии и права. №2. Изд. «ЭЛМ», 1982. с 70

⁴ История азербайджанской философии. 2008. Ч. II. С. 132-133. З.М.Бунятов, Насир ад-Дин ат-Туси: новые биографические данные. Известия Ака наук Азербайджанской ССР. Серия истории философии и право. №2. Изд. «ЭЛМ», 1982. с 70

of the building and astronomical instruments. Starting to organize the library, he invited outstanding astronomers of the Caucasus, Central Asia, Iran, and Arabia to Maragha. The creation of the observatory in Maragha required large cash costs of 20,000 dinars.⁵

Thus, changing the policy of Hulagu khan, Nasir al-Din al-Tusi created favorable conditions for the development of science in Azerbaijan. He became a confidant and personal adviser to Hulagu khan after the capture of Alamut⁶ in November 1256. Predicting the fall of the Ismaili state, he proved the futility of resistance to the Mongols to the last of their lord Rukn al-Din Khurshah ibn Ala ad-Din Muhammad III, persuading him to surrender to Hulagu-khan. Hulagu rewarded al-Tusi for this, allowing him to save from the ruin of the rich Ismaili library and the book depositories of Baghdad, which testifies to his political perspicacity. However, despite this, many historians (for example, Imad-din al-Hanbali) condemned him, believing that it was because of Nasiraddin that Hulagu betrayed the caliph's sword.

On the recommendation of al-Tusi, Hulagu invited the outstanding scientists of

the time who designed and built the famous observatory in the city to Maragha, the capital of Ilkhanids. He also offered the post of khazina (the custodian of the library) to Ibn al-Fuwati⁷ in the At-Tusi Observatory⁸.

In the observatory, apart from the observation platform, special rooms for large instruments, rooms for a library of 400,000 books, other auxiliary premises were supposed. Here a huge storage was created with spacious rooms, which were filled with books taken from Baghdad, Syria and Al Jazeera.⁹ Nasir ad-Din himself in "Zij Ilkhani" writes: "For the construction of the observatory, I summoned a number of scholars including al-Mauayyid al-Urdi from Damascus, al-Fahr al-Maragi, who was in Mosul, al-Fihri al-Hilati, who lived in Tiflis and Najm al-Din Qazvini Dabiran-i. We began construction in Maragha in 652, in the month of Jumada al-awwal first (May 1259).

Before our (Maragheh M.S) observatory there was an observatory of Baradzhus, which was built 1400 years ago. After it, there was the Ptolemy Observatory, which was built in 285, after it, in Islamic times, an observatory of the Caliph al-Mamun, already 430 years old, was built in Baghdad. Next is the al-Bannani Observatory within Syria, the al-Hakimi Observatory in Egypt and the Ibn

⁵ Мамедбейли Г.Д., Основатель Марагинской обсерватории Мухаммед Насирэддин Туси. Издательство Академии Наук Азербайджанской ССР. Баку – 1961. с. 32

⁶ An important role in the surrender of Alamut to the Mongols was played by Nasir al-Din al-Tusi at the age of 30. Once in the state of the Assassins, beginning in Sertakht where he wrote the famous "Nasirean ethics" (Akhlāq-i Nasiri) and then Alamut in 1235, where he finished the commentary on the philosophical work of Ibn Sina's "Remarks and Admonitions" in 1242. In 1248 he completed the mathematical work "Exposition of Euclid" (Tahrir Uqlidis), the astronomical work "Commentary on the Almagest" (Tahrir al-Majisti) and a series of works by Euclid, Archimedes, Theodosius, Menelaus and other ancient mathematicians and astronomers. Б.А. Розенфельд. Астрономия стран Ислама «историко-астрономические исследования», вып. XVII, вып. 1984.

⁷ Ibn al-Fuwati is a follower and associate of famous Nasir al-Din al-Tusi. He was the custodian of the library at the Maragheh Observatory for 10 years. М.Сеидбейли. Сведения о деятелях Азербайджана XIII – начала. XIV века в сохранившейся части сочинения Ибн ал-Фувати (1244-1326) Талхис Маджма ал-адаб фи-л-муджам ал-алкаб. Известия Академия Наук Азербайджанской ССР, изд. «ЭЛМ» БАКУ 1987 год. с.79.

⁸ Сеидбейли М. Научно-культурная жизни Азербайджана второй половины XIII - начало XIV в. (по материалам сочинений Ибн ал-Фувати «Талхис маджма ал-адаб фи му'джем ал-алкаб»). Баку: Чашыюглы, 1999. С. 8.

⁹ Бунятов З.М., Насир ад-Дин ат-Туси: новые биографические данные. Известия Ака наук Азербайджанской ССР. Серия истории философии и право. №2. Изд. «ЭЛМ», 1982. с 70

al-Ilam Observatory. The last two were 250 years old." 10

Unfortunately, the archaeological excavations made so far have not given a complete view of the observatory.

More than 100 employees, scientists and students of Nasir al-Din al-Tusi worked at the Maragheh Observatory, Academy and Library¹¹. He himself conducted classes and seminars on philosophy, calligraphy, mathematics, astronomy and many other disciplines. At the same time, he was engaged in the training of scientific personnel in a special school at the observatory.

During this period, Nasir al-Din al-Tusi, in conjunction with the chief engineer Muayyid-ad Din, invented five astronomical instruments¹².

The observatory had an excellent set of diverse and numerous high-quality instruments worth 20,000 dinars. All astronomical instruments from various cities were brought here.

The well-known scientist A. Berry writes: "A lot of astronomers worked under the general supervision of Nasiraddin. The tools they used were, in all likelihood, better than those that used in Copernicus's time ..." ¹³

In the Maragheh Observatory, terrestrial and celestial globes were produced and exhibited for general review. One of the celestial globe from the Maragheh Observatory, designed in 1279 by al-Urdi, is now stored in the Mathematical-Physical Salon of Dresden State Art Collections. ¹⁴

In the observatory the library occupied several buildings was located, as well as

unique measuring instruments built by order of Nasir-ad-Din. Before the beginning of construction for astronomical observations, astrolabes and a star globe were created. On them were placed 1,022 stars whose positions after the registration process were taken from Zij Ilkhani (Tusi). Scientists of the Islamic East have perfected the astrolabe and began to apply it not only to determine the time and duration of the day and night, but also for the implementation of some mathematical calculations and for astronomical predictions.

Over time, the astronomical instruments of the Maragheh Observatory were used in various observatories of the world. Among them are the observatories of Tycho Brahe, Samarkand and Beijing Observatories.

In this library, 400 thousand volumes of manuscripts were collected in Arabic, Persian and Syrian languages in various fields of science, which were brought here by order of Hulagu-khan from different countries¹⁵.

Among the scholars of Dar-al-ilm ve hikma, which was headed by Tusi himself were scientists from China - Fu Mengchi, India - Kamal ad-Din Aflatun al-Hindi and Ala ad-Din Suleiman al-Multani and other countries¹⁶.

A large number of outstanding scientists worked here, but incomplete information left from them.

M. Mamedbayli in his monograph lists the scientific staff of the Maragheh Astronomical Observatory¹⁷: Muhammad Nasir al-Din al-Tusi, Qutb al-Din al-Shirazi¹⁸,

¹⁰ See there, p.73

¹¹ *Мустафа Джавад*. Ибн ад-Фувати Талхис маджма ал-Адаб фи-л-Муджам ал-алкаб («Сокращённый сборник сведений в словаре титулов») Дамаск, 1962-1967. С. 19.

¹² *Мамедбейли Г. Д.*, Основатель Марагинской обсерватории Мухаммед Насирэддин Туси. Издательство Академии Наук Азербайджанской ССР. Баку – 1961. с. 199

¹³ *Берри А.* Краткая история астрономии. М.; Л., 1946. с.79.

¹⁴ *Розенфельд Б. А.* Астрономия стран Ислама // Историко-астрономическое исследование. М.: Наука, вып. XVII, вып. 1984.

¹⁵ *Сеидбейли М.* Научно-культурная жизни Азербайджана второй половины XIII - начало XIV в. (по материалам сочинений Ибн ал-Фувати «Талхис маджма ал-адаб фи му'дjam ал-алкаб»). Баку: Чашыоглы, 1999. С. 8.

¹⁶ See there, p. 10

¹⁷ *Мамедбейли Г. Д.*, Основатель Марагинской обсерватории Мухаммед Насирэддин Туси. Издательство Академии Наук Азербайджанской ССР. Баку – 1961. с. 194

¹⁸ Qutb al-Din al-Shirazi (1236 -1311) studied medicine. Upon his arrival in Maraga, he, under the direction of Nasir al-Din, began to study mathematics and astronomy, and achieved great success in these fields. But then Shirazi was forced to leave Maragha, as his teacher did not like his success. At that time he worked as a doctor and judge in Iran

Gregory Abu'l Faraj, Muvayiddaddin Ordi, Najm al-Din Qazvini Dabiran-i, Fakhreddin Ikhlati, Fakhreddin Maraghi, Mohiuddin Kamal¹⁹, Sheikh Kamal, Mahmud Najm al-Din Damgani Ustelebi, Khusameddin Shami, Sedreddin Nasir Tusi, Najm al-Din al-Katibi, Fu Mengchi, Isa Mongol, Taqi ad-Din al-Khashaishi, Nafis al-Din bin Tolaib, son of Safi ad-Din Nasrani, Muhammad bin Muvayiddaddin Ordi, Abi al-Shukr al-Maghribi, Jamal ad-Din Muḥammad al-Zaydi al-Bukhari.

For a scientific institution of that time, this is a very large number of employees. It is necessary to add the following: based on the data of some historical documents, it can be stated that there were more than 100 employees in the Maragheh Observatory. According to Rashid ad-din, after Khulagu's death, Khan was succeeded by Abaga Khan. On the occasion of the coronation of Abaga Khan, awards were distributed. The list of scientists of the Maragheh Observatory was presented by Nasir ad-Din, whom he asked to be awarded. Rashid ad-din writes: "About a hundred honorable scholars from teachers of the human race, Khoja Nasiraddin Tusi," May the Lord have mercy on him - who were at the court, he paid out of the general remuneration"²⁰.

and Asia Minor. But soon he again returns to the state of Ilkhanids, of which capital (1295-1304) moved to Tabriz by Mahmud Ghazan-khan. Here he headed the observatory, which became the successor of the Maragheh Observatory. The famous mathematician and astronomer Nizam al-Din Hasan al-Nisaburi and the optician Kamal al-Din al-Farisi worked at the Tabriz Observatory. And Shirazi left a large number of works on astronomy. *Б.А. Розенфельд. Астрономия стран Ислама «историко-астрономические исследования», вып. XVII, вып. 1984.*

¹⁹ Mohiuddin from Maghrib is the author of a very popular work on the critical analysis of Almagest.

²⁰ Рашид ад-Дин сборник том III. пер. с персидского под ред. Рамаскевича с участием А. Ализаде М.-Л, 1946 год с.32

Judging by the number of employees, the Maragheh Observatory was the largest of all medieval astronomical observatories larger than the Ulugbek Observatory, the Jaipur Observatory in India²¹.

Almost all astronomers and mathematicians of the Near and Middle East and North Africa: Ibn Kurra and al-Farghani (IX c) al-Khujandi, as-Sagani and As-Sufi (X c), Al-Biruni (X-IX cc), al-Hazini (XII c.), Nasir al-Din al-Tusi (XIII c.) and others were the authors of the works devoted to the astronomical instruments.

The result of 12-year observations of Maragheh astronomers from 1259 to 1271 became the "Ilkhanic Tables" ("Zij-i Ilkhani")²². It contained tables for calculating the position of the Sun and planets, a star catalog, and the first six values of the tables of sines and tangents at 1' interval. Based on observations of the stars, al-Tusi accurately determined the value of the precession of the equinoxes²³.

The famous orientalist I. Krachkovsky emphasizing Nasir ad-Din's treasure in the field of astronomy and mathematics singles out his work "Ilkhanic Tables"

Nasir-ad-Din Tusi intended to study the stars in the sky during 30 years, according to him, all the planets complete the full conversion and only the impatient perseverance of the khan forced almost 2/3 to shorten the observation period.

The Maragheh Observatory had a great deal of influence on the observatories of many countries of the east, including the ob-

²¹ Мамедбейли Г. Д., Основатель Марагинской обсерватории Мухаммед Насирэддин Туси. Издательство Академии Наук Азербайджанской ССР. Баку – 1961. с. 194-195

²² "Zij-i Ilkhani"- an astronomical catalog that was compiled by Nasir al-Din al-Tusi and his colleagues of the Maragheh Observatory for 20 years.

²³ Насреддин ат-Туси.
dic.academic.ru/dic/nst/sie/18010/ТУСИ.

servatory in Khanbalik²⁴ (now called Beijing), as well as the astronomical observatory of Ulug Beg. Between astronomers of the Maragheh Observatory and Beijing astronomers there were close scientific ties.

For example, the Azerbaijani historian in XIII in Rashid ad-Din said that the construction of the Beijing Observatory was entrusted to Jamaledin, but since he was not fully competent in this matter, he had to send an observatory to the Maragheh Observatory to study the experience of its construction²⁵. Thus, during the construction of the Beijing Observatory of the XIII century and the design of its instruments, the experience of the Maragheh Observatory was studied and some of its instruments were copied.

Nasir al-Din al-Tusi has the great merit of solving the fifth postulate of Euclid that two parallel lines intersect in space.

The importance of this problem for the creation of a common cosmology, can be seen from the fact that many centuries later such great minds as Augustin-Louis Cauchy, Carl Friedrich Gauss, Nikolai Lobachevsky continued to work on it. It was Lobachevsky, with the help of the Russian scientist of Azerbaijani origin Mirza Kazym-Bek (who at the request of the first translated Tusi's work from Persian into Russian) managed to solve this problem. As a result, Lobachevsky's famous work on non-Euclidean geometries²⁶.

Tusi's name as a mathematician stands in line with Pythagoras, Euclid. Among the mathematical works of al-Tusi known is the "Treatise on the Quadrilateral". The treatise was written in Persian, during his stay in Alamut, and in Arabic in the brief form in Maragha. In "The Collection of Arithmetic with the help of board and dust" (1265) al-Tusi described in detail extraction of roots from all degrees: on the example $^4 2441400626$ al-Tusi gives a table of binomial coefficients in the form of a triangle, now

known as the Pascal triangle here. The well-known Oriental philosopher Muhammad Iqbal in the article "The Spirit of Islamic Culture", characterizing Tusi, writes: «Tusi brought mathematics from the millennial to the next. He put forward the idea of a hyperplane»²⁷. For the first time in the history of world science in this work, trigonometry is regarded as an independent field of science. This treatise was translated into English, Russian and French. In addition, the treatise called "Exposition of Euclid's Elements" by Tusi, printed in 1594 in Arabic and subsequently in Latin, played a huge role in spreading Tusi's scientific ideas in Europe.

Thus, in his writings he laid the foundations of celestial mechanics. After 400 years they were rediscovered by Western European scientists. The Danish astronomer Tycho Brahe (1546-1601), repeating Tusi's calculations, compiled a catalog of over 700 stars. Based on the works of Brahe, I. Kepler studied celestial mechanics. I. Newton, relying on their works, achieved the fundamental laws of mechanics. Tusi's mathematical works have been published many times in Italy, England, and in France - the main centers of the European Renaissance.²⁸

Nasir al-Din al-Tusi is the author of 20 famous scientific works on mathematics and astronomy. Author of scientific works in the field of physics, economics, philosophy, medicine, geography, mineralogy, ethics, logic, he wrote more than 100 scientific papers. His works such as "On Jewels", "Sphere and Cylinder", "On the Calendar", "The Law of Medicine", "The Book of Valuable Stones", "Optics of Euclid" and many others are stored in the scientific libraries of Baku, Paris, Berlin, Vienna, Oxford, Cambridge, Istanbul, Moscow, St. Petersburg, Florence and other cities.

The scientific authority of Nasir al-Din is great; the abundance of his works in many fields of science is of great interest to re-

²⁴ Khubilai led the construction of a similar observatory under the leadership of Jalal ad-Din, which is still operating in the center of Beijing.

²⁵ Мамедбейли Г. Д., Основатель Марагинской обсерватории Мухаммед Насирэддин Туси. Издательство Академии Наук Азербайджанской ССР. Баку – 1961. с. 218, 220.

²⁶ http://people.ziyonet.uz/ru/person/view/_at_tusiy

²⁷ Алиева С. М. Моральные феномены Насреддина Туси и Рихарда Вагнера (Мысли в литературном и философском контекстах). Религия – наука – общество: проблемы и перспективы взаимодействия. Материалы международной научно-практической конференции 1–2 ноября 2011 года. Пенза – Липецк – Семей 2011. с.27

²⁸ <https://www.baku.ru/blg-list.php?id=91234>

searchers. Azerbaijani scientist Farid Alekperli, investigating the work of Nasir al-Din al-Tusi, noted that, despite the large amount of literature, both local and foreign, many details of the scientific and philosophical activity of al-Tusi remained, as it were, beyond the scope of research, namely, there is not a single special work devoted to the evolutionary views of the scientist, the evolutionary theory, nor the contribution of Nasiraddin to the development of biological thought in the medieval East²⁹.

In addition to mathematics and astronomy, Nasir al-Din traces a large number of studies in the field of logic, theology, and physics. Medieval history is often the history of theology. Affecting the religious and philosophical foundations of the evolutionary theory of Tusi, I would like to note that the picture of the evolution of the world, drawn by him, is of an ideological nature peculiar to his time. On the one hand, the philosopher enthusiastically writes about God's perfect creation of the surrounding world, on the other hand, recognizes the self-development and self-improvement of matter. According to Tusi, nature as a whole and every creature individually can develop and improve independently, but God inspires and directs this development. Thus, once created by God, the world further develops itself according to the plan of the Creator.

However, in all manifestations of his worldview, the great scientist retains faith in the person's ability to cognize.

In his book "Akhlaq-i Nasiri" (A work on ethics), Tusi presented his ethical views, which represent the new moral paradigms of his time. In this treatise, Tusi raises the problems of being that forms the basis of human behavior, but his main idea is the theme of human origin. According to Tusi, human is the highest form of intelligence in the universe. Tusi knew Greek philosophy well, gave

an objective interpretation of the works of Aristotle, Plato, as well as Porphyry, the famous mathematician and logic of the Middle Ages³⁰.

His treatise "Nasirean Ethics" is today considered the best example of artistic and philosophical literature. This treatise is translated into many languages. In this treatise, the author raises the problems of being, exploring the philosophical aspects of the human character, examines the problems of good and evil.

In this article, it is impossible to describe all the activities of this outstanding scientist, who was considered the "king of science" in the East. But one can definitely conclude that he possessed a high scientific potential. As it was stated earlier, in the Middle Ages the blossoming of science was observed in the East and special attention was given to world scientific knowledge. IX-XIV centuries were marked by the "Golden Age" - the Renaissance - the Eastern Renaissance. In this Golden Age, in our opinion, it is possible to inscribe the name of the outstanding thinker of that era, Nasir al-Din al-Tusi, in golden letters. From Maragha, Nasir al-Din al-Tusi moved to Baghdad, where he died in 1274, he was 80 years old. After his death, his son took the post of the head of the observatory.

As a sign of special respect, Nasir al-Din al-Tusi was called "hodja" (mentor, a wise man). He was buried in a mosque, Jama Masjid and the calligraphic inscription on his grave reads: "The protector of religion and people, the Shah of the country of Science. He is the only one, such a son had never before been born."

²⁹ Алекперли Ф. Эволюционные взгляды Насреддина Туси. Баку: Орнак, 2000.

³⁰ Алекперли Ф. Эволюционные взгляды Насреддина Туси. Баку: Орнак, 2000

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